Risk Assessment
Importation of Feeder Cattle to the United States From Australia

Diseases of Concern:
Bluetongue, Akabane, Aino, Bovine Ephemeral Fever, Babesiosis, Brucellosis, Tuberculosis

Opening Summary

March 13, 2000

United States Department of Agriculture
Animal and Plant Health Inspection Service
Policy and Program Development
Veterinary Services

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Objectives of the Assessment

The Animal and Plant Health Inspection Service (APHIS) and the Australian Quarantine and Inspection Service (AQIS) recently negotiated protocols defining provisions for exporting Australian feeder cattle to the United States. The objectives of the risk assessment are to evaluate the risk of transmitting bluetongue (BLU), akabane, aino, bovine ephemeral fever, babesiosis, brucellosis, and tuberculosis while the restrictions of the negotiated protocols are being observed.

Approaches to Individual Diseases and Transport Through Mexico

1. The assessment of BLU risk is quantitative and based on probability estimates. Risk is evaluated with a 60-day pre-embarkation quarantine for all animals. The assessment is based on the assumptions that cattle may originate from any region of Australia, including regions affected by BLU.

2. Separate risk assessments are not performed for akabane, aino, and bovine ephemeral fever. Animals with these diseases are subject to the same 60-day pre-embarkation quarantine observed for BLU, and the durations of viremia for these diseases are significantly shorter than the duration of viremia for BLU. On the assumption that the quarantine reduces the risk of BLU to an acceptable level, the risk of introducing akabane, aino, and bovine ephemeral fever should also be reduced to an acceptable level.

3. The evaluations for brucellosis and tuberculosis are based on APHIS risk assessments performed before generation of this report. On the basis of these assessments, it has been concluded that Australia is free from both diseases.

4. The risk of introducing babesiosis is considered acceptable because the protocols require standard mitigations for this disease.

5. The risk of importing Australian cattle into the United States through Mexico is compared with the risk from direct shipment. Because transit through Mexico takes longer than direct shipment from Australia**,** the risk of transshipment of cattle through Mexico is considered less than the risk of direct shipments from Australia.

The remainder of this summary will address the risk of transmitting BLU through direct shipments of cattle from Australia.

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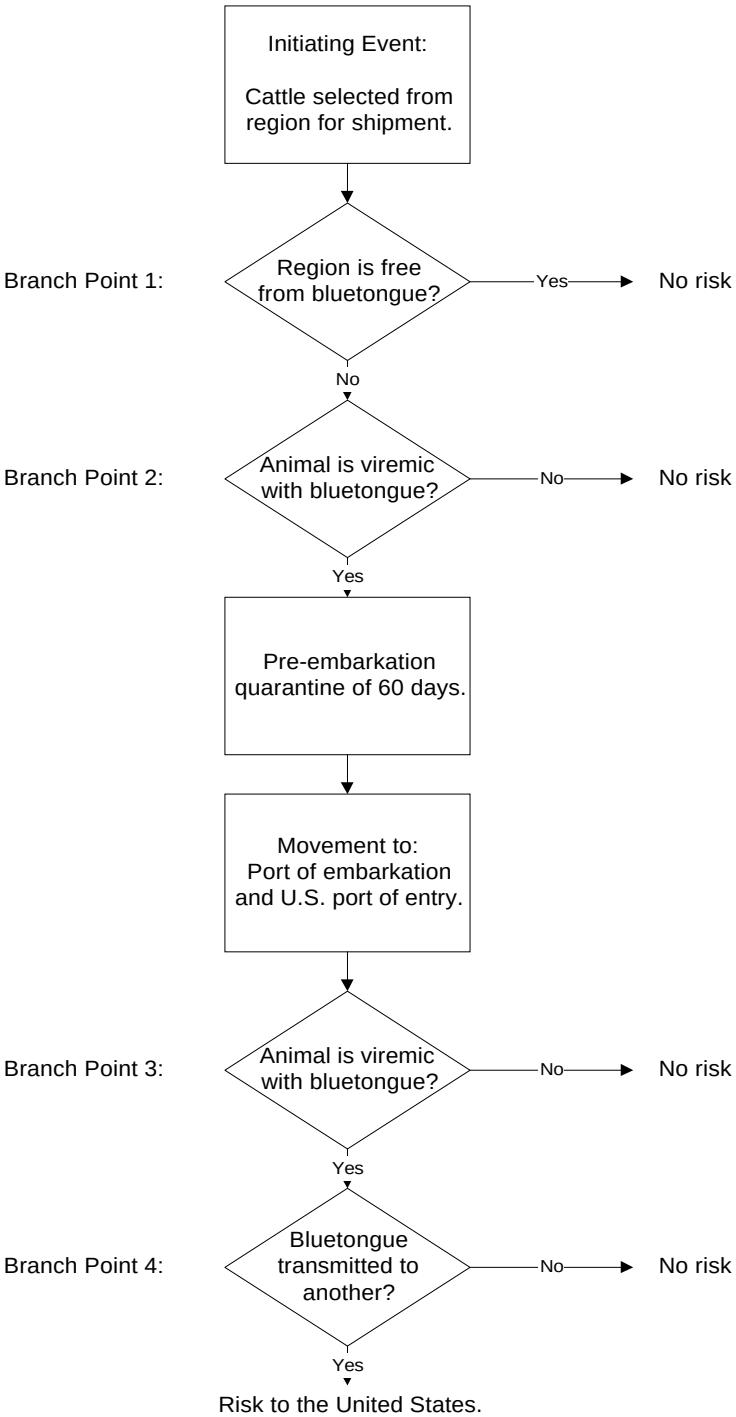
BLU Risk Assessment

The risk assessment estimates the probability that cattle exported from Australia will introduce BLU into the United States and is based on the assumption that a viremic animal is capable of transmitting disease. A scenario tree (Figure 1) describes the sequence of events evaluated. The assessment begins by estimating the probability that a viremic animal from the BLU-affected region of Australia will enter the pre-embarkation quarantine facility. Next, the assessment estimates the probability that such animals remain viremic throughout the quarantine period and the period of transport to the United States. Finally, the assessment provides descriptive information on the likelihood that an animal which has remained viremic throughout the quarantine period and the period of transport to the United States remains infective to animals after entry.

Initiating event

As shown in Figure 1, the initiating event is the selection of feeder cattle from Australia for shipment to the United States.

Figure 1 - Scenario Tree:
Export of feeder cattle from Australia to the United States



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Branch Point 1

Branch Point 1 separates cattle into animals selected from the BLU-affected and the BLU-free regions. APHIS's assessment of risk is limited to animals originating from the affected regions and is based on projections of the number of cattle that will be imported from affected regions. Previous APHIS assessments identified unaffected regions and assessed the risk of transmitting BLU from animals exported from these regions to be negligible.

The Australian Quarantine and Inspection Service (AQIS) projects that up to 150,000 to 200,000 cattle will ultimately be exported per year. Approximately 30,000 of these may originate from the BLU-affected zone. Risk is estimated based on the annual export of these 30,000 cattle.
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Branch Point 2

An animal entering the pre-embarkation quarantine from the BLU-affected region may be viremic or nonviremic. The underlying question posed at Branch Point 2 is: Of all the cattle from Branch Point 1 coming from the affected region, what is the probability that the number of ***viremic*** cattle entering pre-embarkation quarantine is 0, 1, 2, 3,... , ... n_2?

Quantitative estimates are based on extensive surveillance data provided by AQIS and published data.

Branch Point 3

Branch Point 3 asks, of all the ***viremic*** cattle entering the pre-embarkation quarantine from Branch Point 2 (0, 1, 2, 3, ..., ... n_3), what is the probability that no cattle are viremic when arriving at the U.S. port of entry? The assessment for Branch Point 3 includes a consideration of the number of days that an animal has been viremic upon entry into quarantine, the duration of quarantine, and the number of days of travel from the end of quarantine until the animal enters U.S. port of entry.

Quantitative estimates are based on published data.

Branch Point 4

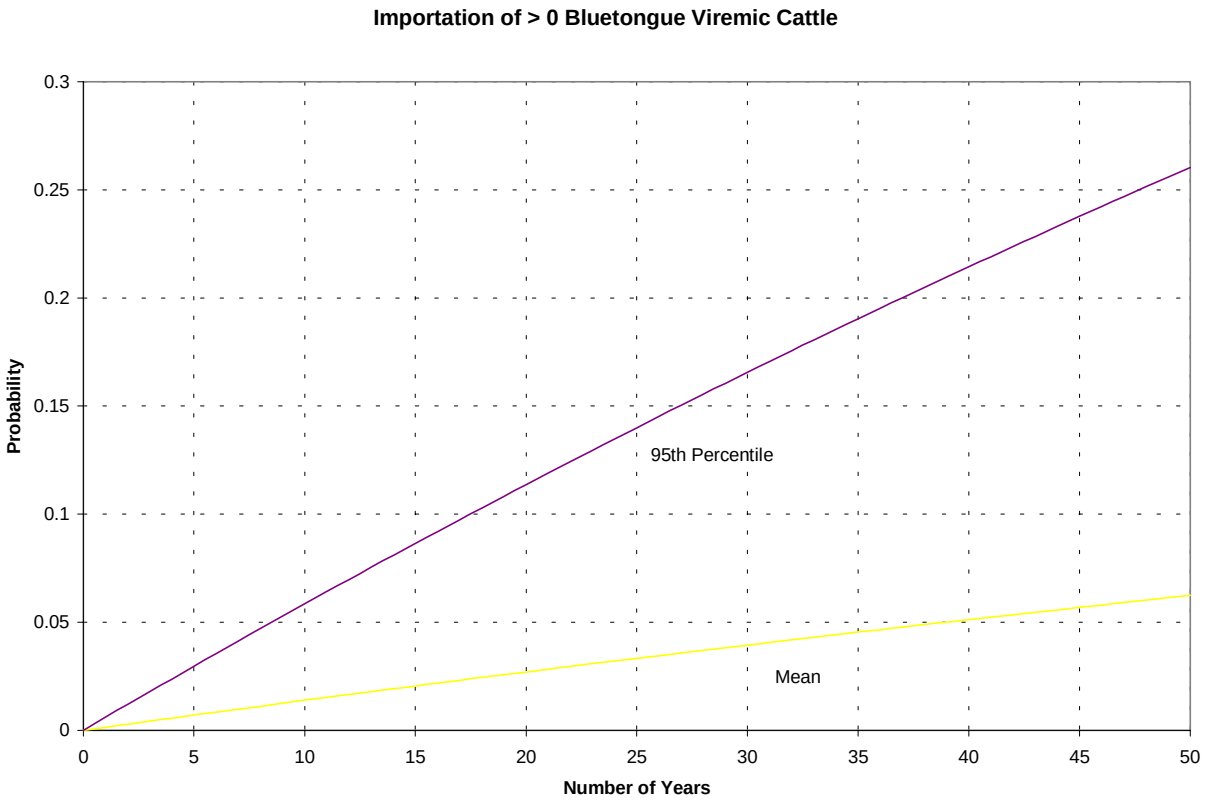
Branch Point 4 addresses the likelihood that a viremic animal entering the United States will infect U.S. livestock or wildlife. Although insufficient data are available to quantify this probability, the likelihood is considered extremely small. This assumption is based on considerations of the minimum level of viremia necessary to transmit disease, the lack of evidence that U.S. midges are competent to transmit Australian BLU serotypes, the lack of evidence that Australian BLU

serotypes cause disease in Australian commercial sheep, and the lack of historical support for movement of BLU in international trade.

Summary of Results

The probabilities that one or more viremic animals will enter the United States as a function of time in years are presented in Figure 2. The figure reports probability values (y-axis) for a range of 0 to 50 years (x-axis).

Figure 2. Probability of Importing BLU-Viremic Cattle Within 50 years



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Statistical variability around the mean is described by 95th and 5th percentiles. The maximum upper limits of this variability are shown as the 95th percentile line. The minimum level of variability (5th percentile) has a value of 0 probability for all years and is, therefore, concurrent with x-axis values. Since the values fall on the x-axis throughout the entire 50-year period, 5th percentile values are not identified specifically in the figure.

Variability is large, which suggests a high degree of uncertainty. For example, at 40 years, the 95th and 5th percentile values around the mean of 0.051 are 0 and 0.214, respectively.

The number of years before importing one or more viremic animals is estimated. The expected value is 332 years. It is important to recognize that, although this is a useful value to assess risk, it represents a point estimate that does not reflect uncertainty.

The observation that importing a viremic animal is expected at all is somewhat surprising in view of the low probability that an animal will remain viremic after a 60-day quarantine. However, this is explained by the relatively large number of projected imports from BLU-affected zones (30,000 animals annually).

The evaluation assesses the likelihood of disease transmission to United States livestock or wildlife if viremic animals enter the United States. The discussion of Branch Point 4 suggests, albeit primarily on the basis of indirect evidence, that these animals are not likely to be infective.

This assessment supports the mitigation provided by a 60-day pre-embarkation quarantine.